

Effect of learning instructional program on quality of life among patients with permanent pacemaker Device

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Abstract

Background: A permanent pacemaker is a small device, approximately a matchbox size, placed beneath the skin in chest or abdomen to regulate abnormal cardiac beats. Assessing the quality of life (QOL) in individuals received permanent pacemaker implantation is essential in clinical environments. This process provides valuable insights for nurses into how the condition and its treatment impact patients' everyday lives. It also offers a prospect to recognize their preferences, expectations, and needs related to the disease and its management. **The aim** was to evaluate the effect of learning instruction program on QOL among patients with permanent pacemaker device.

Research Design: a quasi-experimental research design to examine the study goals. **Setting:** Study was performed in the Cardiac Intensive Care Unit, the Cardiology Department, and the outpatient clinics at Zagazig University hospitals. **Sample:** 50 adult patients purposefully selected from both male and female participants. **Tools:** Data were collected using three instruments: 1. Patient Interviewing Questionnaire, 2. Observational Checklist, and 3. Euro QOL-5Dimensions (EQ-5D) structure interview schedule **Results:** study outcomes indicated that the majority of the participants were male (86%), with ages ranging from 43-68 years. Additionally, 64% of the patients had a history of myocardial infarction. Results also revealed statistically significant enhancement in patients' knowledge, practices, and overall QOL post-intervention phase. **Conclusion:** Significant statistical variations were noted among the before and after learning evaluation of the patients about their knowledge. Assessment of practice and QOL three months following continuous pacemaker implantation. **Recommendations:** A replication of this research with a larger, more heterogeneous sample size and over an extended time is essential to corroborate the findings of the present investigation.

Keywords: Learning instruction, Quality of life, permanent pacemaker device.

Introduction:

Cardiovascular diseases (CVDs) are among the leading causes of chronic, progressive, and life-threatening conditions worldwide. A report by WHO indicated that, in 2005, CVDs were responsible for 41.3% of all deaths in Iran. This figure is projected to rise to 44.8% by 2030, highlighting the growing burden of these diseases on public health in the country. (Khodadadi, et al., 2013, and Aliakbari, et al., 2021)

Arrhythmia is a major contributor to cardiac-related mortalities, placing a significant burden on global health. Pacemaker implantation serves as the primary treatment for symptomatic bradycardias (Zipes et al., 2018). It is estimated that approximately 3 million individuals worldwide rely on pacemakers, with about 600,000 new

pacemakers being implanted per year. In Iran, around 550 new permanent pacemakers are implanted annually (Greenspon et al., 2012)

In recent decades, new treatments for congestive heart failure (CHF) were established, with pacemakers now being the preferred option for managing CVDs (Proietti et al., 2017). In Egypt, the pacemaker implantation rate stands at 2.66 per million people. Globally, around 600,000 pacemakers are implanted each year, with approximately 3 million people relying on pacemakers worldwide (Chen et al., 2017).

Permanent pacemaker implantation (PPI) is linked to a marked decline in mortality rates. The use of implantable cardiovascular electronic devices has significantly increased these devices have been widely employed in the past twenty-years to treat potentially lethal

arrhythmias and non-arrhythmic disorder e.g. chronotropic incompetence and heart failure (Perez et al., 2018). Annually, around 1.25 million pacemakers are implanted globally (Carrión et al., 2019 & Raatikainen et al., 2017). Data from the cardio-electrophysiology unit at the Main University Hospital indicated that approximately 200 patients underwent pacemaker implantation in 2018 alone (Teleb, 2021).

A permanent pacemaker is a compact device, roughly matchbox size, that is implanted under the skin of the chest or abdomen to help manage irregular heart rhythms. Typically, it weighs between 20 to 50 grams (Mohammed, Abd Elstar, & Mohamed, 2020). The pacemaker consists of a generator powered by batteries and a circuit that generates electrical impulses to regulate the heart's rhythm through leads. In addition, the pacemaker's electrodes monitor the heart's electrical activity, sending the information back to the generator, which then adjusts its electrical output accordingly (Ibrahim et al., 2024).

The PPI can provide considerable difficulties for patients and their families for several reasons. One of the primary concerns is the psychological stress patients may experience from relying on artificial device, along with fears of potential device failure, the risk to their lives, and elevated cost of pacemaker devices (Sharma Singh & Sharma, 2018). Moreover, the implantation process is complicated by numerous factors, including possible complications during both the early and late stages post-operative, the follow-up care, and the understanding that the pacemaker is a lifelong treatment. Patients often face difficulties due to inadequate preparation for post-implantation care, which includes managing the pacemaker and battery, caring for the insertion site, following activity restrictions, coping with electromagnetic interference, adhering to dietary guidelines, recognizing signs of pacemaker malfunction, and maintaining scheduled follow-up appointments (UOHI, 2018).

The PPI represents a major life event for many patients, as it plays a crucial role in preventing potentially fatal arrhythmias. While pacemakers are life-saving devices, they do

introduce changes to a patient's normal lifestyle (Khalil et al., 2020). For example, patients may experience restrictions in their range of motion, particularly with movements involving internal rotation, flexion, and abduction, which would impact everyday activities e.g. showering and sleeping on pacemaker side. Moreover, patients are advised to avoid electromagnetic interference and must remain vigilant for warning signs like dizziness, shortness of breath, and irregular heart rhythms (Shenthar et al., 2016; Weheida et al., 2021).

CVDs affect both the physical health and overall patients' quality of life (QOL), frequently limiting their autonomy by making it harder for them to carry out routine tasks. These conditions can also have profound effects on a patient's psychological and cognitive well-being. Managing risk factors through health education, coping strategies, self-efficacy, and improving QOL is crucial for enhancing the lives of individuals with CVDs. However, there is a notable gap in research specifically addressing the coping mechanisms and self-efficacy of patients with pacemakers. Most prevailing studies tend to concentrate on medical and physiological features of PPI use, leaving the psychological and social dimensions less explored. Furthermore, little is known about longterm impacts of having a PPI, particularly considering variables progress overtime & affect QOL (Rubio et al., 2021; Ibrahim et al., 2024).

The demand for cardiac pacemaker implantation continues to rise, driven by both longer life expectancies and the ongoing advancements in pacemaker technology. However, despite the benefits of electrical interventions used to manage arrhythmias and other heart conditions, these procedures often come with a range of complications. Patients undergoing these treatments frequently experience multiple symptoms that lead to a reduced tolerance for daily activities, which in turn impacts their overall satisfaction and QOL (Udo et al., 2013).

The QOL is a measure of how a disease and its treatment impact a patient's life, focusing on their perspective & experiences. Poor QOL is often linked to worsening disease severity, reduced survival rates, more frequent hospital

admissions, & a decline in cardiac function (Naimi et al., 2020). Evaluating QOL is especially crucial for patients with chronic, progressive illnesses, as it allows healthcare providers to view them as active, holistic individuals and assess the long-term effects of their condition and treatment (Buiting & Olthuis, 2020). In clinical settings, assessing the QOL for patients after permanent pacemaker implantation enables healthcare professionals, especially nurses, to help patients identify needs, expectations, and preferences relating to their sickness and to understand how illness and its treatment affect their life. (Chapagai et al., 2017). Despite the growing emphasis on QOL research across various patient populations, there is still limited research on this subject, particularly in Egyptian patients with pacemakers. This underscores the necessity for additional research, as QOL is a valuable tool for evaluating the success of therapeutic interventions and healthcare, underscoring the relevance of this research (Sikora et al., 2021).

Nurses play a vital role in understanding patients' perspectives on QOL to enhance the care they provide and, ultimately, improve patient outcomes. Their focus on QOL is essential, as it can influence treatment decisions, including prescription choices, adjustments to treatment plans, and decisions regarding the continuation or cessation of therapies. For patients with chronic conditions, such as those requiring permanent pacemaker implantation (PPI), assessing QOL is crucial for nursing managers. This assessment aids in the efficient allocation of healthcare resources and the resolution of patient care challenges (King, 2011). As integral members of the healthcare team, nurses possess the chance to positively influence patients' QOL through targeted nursing interventions. To do so effectively, it is important for nurses to first evaluate the QOL of patients with PPI (Naimi, 2020).

Patients who undergo permanent pacemaker implantation (PPI) often experience physical limitations due to their underlying medical conditions. Common symptoms such as palpitations, chest discomfort, shortness of breath, and fatigue are frequently reported. While the use of a pacemaker is intended to

alleviate these signs improving the QOL, it is not without potential drawbacks. Issues such as device malfunction, infections, PPI syndrome, and disruptions to the patient's daily routines can arise. The pacemaker itself may also introduce changes to a patient's lifestyle, making it crucial to assess their QOL after implantation. Evaluating how the device affects daily life is vital for developing care plans that address specific challenges impacting the patient's well-being. The outcomes of such assessments may inform further investigations, involving longitudinal studies and clinical trials focusing on therapies meant to improve the QOL of pacemaker patients (Gonçalo et al., 2020).

The limitations imposed by a pacemaker can significantly impact a patient's ability to perform job duties, engage in social activities, and maintain relationships, often leading to social isolation and psychological issues such as depression. These factors collectively contribute to a decline in the patient's QOL. QOL is a crucial measure that encompasses multiple dimensions, involving functional, physiological, and existential aspects. It serves as a key indicator for assessing the effectiveness of therapeutic interventions and understanding their impact on a patient's overall health (Figueroa et al., 2016).

Considering that many current studies are centered on patient education, it seems crucial to explore the impact of instructional training on individuals' QOL with permanent pacemaker implants. Investigating how educational interventions affect patients' understanding and adaptation to their condition could have a crucial role in enhancing their overall health outcomes.

the significance of the study:

A permanent pacemaker is a critical life-saving technique that prevents unexpected death. Patients undergoing the installation of cardiac instruments comprises a valuable share of contemporary healthcare protocol. Approximately 3 million individuals globally have pacemakers, with 600,000 new implants occurring annually. The management of a swiftly growing patient population is a challenge for all healthcare workers in cardiology wards, operating rooms, or primary

care settings. **Bayomi (2020)**. The patient must get ongoing education to enhance knowledge, practice, and QOL.

Aim of the study

This study aimed to evaluate the impact of learning instructional program on QOL among patients with permanent pacemaker device. This was achieved by the following objectives:

1. Appraise patients' knowledge and practices concerning permanent pacemaker device.
2. Assess QOL among patients with permanent pacemaker device.
3. Develop and implement learning instructional program for patient's permanent pacemaker device.
4. Evaluate effect of learning instructional program on QOL among patients with permanent pacemaker device.

Research hypotheses

- H₁:** Patients' post-learning knowledge scores will be significantly greater than their pre-learning knowledge scores.
- H₂:** Patients' post-learning practice scores will exceed their pre-learning practice scores.
- H₃:** Learning instructional intervention will have a positive effect on enhancing the QOL of patients.

Participants and Methods

Research Methodology:

Design

Quasi-experimental approach was utilized. The causal connection between independent and dependent variables is the subject of quasi-experimental research design. Independent factors affect the dependent variable, where the latter is being affected (**Loewen & Plonsky, 2016**).

Setting:

The research was performed at the Cardiac Intensive Care Unit, Cardiology Department, and outpatient clinics of Zagazig University Hospitals.

Subject:

A purposive sample of (50) patients with permanent pacemaker device. Patients with mental disorders, as well as those unable to communicate were excluded from the study.

- **Sample Size:** The sample size was determined to estimate a suitable knowledge, practice, and QOL level of 60% or above, with a 5% absolute precision at a 95% confidence level. Employing the single proportion equation with finite population adjustment (Epi Info 6.04 statistical software program). The formula for determining sample size is $n = N * X / (X + N - 1)$, where $X = Z_{\alpha/2} * \sqrt{p * (1-p)} / MOE^2$, the determined sample size was 50 patients.

Tools: Three instruments were utilized to gather data:

Instrument I: An interview questionnaire, designed by the researchers in Arabic, was created after reviewing relevant literature (Sikora et al., 2021; Magnusson & Liv, 2018). The questionnaire was divided into three sections:

Section 1: Socio-demographic Information: This section covered 8 questions as patients' age, gender, residence, marital status, education level, occupation, income & Crowding index.

Section 2: Clinical Data: Current section gathered information about the patient's clinical profiles, including 5 questions about their medical diagnoses, illness duration, family history of CVDs, prescribed medications, and symptoms before pacemaker insertion.

Section 3: Patients' Knowledge: This section aimed to assess the patient's Knowledge of the permanent pacemaker device; it was consisted of 15 questions in MCQ form covering three main topics, heart; basic structure and function of the heart. The Pulse: normal pulse rate, pulse measurement sites, and techniques for measuring the pulse. The artificial pacemaker: definition, indications for use, types of pacemakers, functionality, battery replacement, potential complications, preventive measures for complications,

relevant medications, signs of malfunction, and the importance of regular medical follow-ups.

Patients' knowledge scoring system: For knowledge items the correct answers were predetermined according to literature review, a correct answer scored (1) however, incorrect scored zero. The total knowledge scores were considered satisfactory if the score of the total knowledge $\geq 60\%$ and considered unsatisfactory if it is less than 60%.

Tool II- Observational Checklist: It was adapted from Yossif & Abd- El-aal, (2017) and modified by the researcher to evaluate patients' practices regarding permanent pacemaker device totally 28 steps such as pacemaker incision care 11 steps, measure the pulse rate 7 steps, precautions included 10 steps as avoid tight- fitting clothing over the pacemaker site, avoiding pressure over site, keeping call phone opposite side of pacemaker, caring pacemaker card always and wear a medical alert bracelet or tag. keeping pacemaker site dry and clean, don't lifting heavy weights by pacemaker implanted side arm, staying away from electromagnetic interference, not performing exertion physical activities and not lifting arm above shoulder level.

A completed response received a score of 1, whereas an unfinished response received a score of 0. If the total patient practice score was at least 60%, it was deemed satisfactory; if it was below 60%, it was deemed unsatisfactory.

Tool III: Euro QOL - 5Dimensions (EQ-5D) structure interview schedule: This tool was established by Euro-QOL-group (1990) to appraise QOL and was adapted by Euro-QOL-group (2005). It included the two elements listed below:

A- The EQ-5D-5-Level structure interview schedule: It include the following five dimensions:

- 1- Mobility (the ability of the patient to move in comparison with before the surgery).
- 2- Self-care (the ability of the patient to wash or dress him or herself)

- 3- Usual activities (the ability of the patient to return to previous activities such as work, study, housework, family or leisure activities)
- 4- Pain/discomfort (degree of pain or discomfort feeling)
- 5- Anxiety or Depression (degree of anxiety or depression)

The scoring system: A scoring system related to patients' QOL response was scored on five dimensions have five levels of problems: no problems, slight or mild problems, moderate problems, sever problems, and extreme problem All questions were scored negatively (5-1), five indicating lower QOL, and one indicated higher QOL).

Total score for patients' responses were classified as the following: - A score of more than or equal 60% was considered high QOL. A score of less than 60% will be considered low QOL.

B - Visual analogue scale (VAS): It used a 20-cm vertical line (0–100) to record the respondent's self-rated health. With endpoints designated "100," which represents the highest possible health, and "0," which represents the poorest possible health, it was used to evaluate health status. The sum of the patients' replies was categorized as follows: A acceptable health state was defined as a score of 60% or above. Unsatisfactory health state will be defined as a score below 60%.

Content validity

An expert panel of three Medical-Surgical Nursing professionals evaluated the tools for their thoroughness, relevance, and clarity, one Geriatric nursing professor, and one cardiology professor. The expert group verified the face and content veracity of the instruments. No improvements were made to the tools based on the expert's revisions and the pilot study findings.

Tools Reliability

The reliability of the patient's knowledge and observational checklist for practice was assessed, with results of 0.75% and 0.852%, respectively. Additionally, QOL was evaluated using the alpha Cronbach coefficient, which was determined to be 0.84%.

Ethical considerations

Prior to the interview, verbal consent was obtained from each patient after providing a brief explanation of the study's purpose. The patients were assured that any information collected would remain confidential and solely used for research purposes. They were also informed of their right to withdraw from the study at any time without the need to provide any justification. Ethical approval was granted by the Scientific and Ethics Committee of the Faculty of Nursing at Zagazig University (I.D.Z.U.NUR/225 - 1/ 4/2024).

Pilot study

A pilot study was conducted with 10% of the total patient sample to evaluate the clarity, visibility, and time needed to complete the tools. Since no changes were made based on the pilot study, these patients were subsequently included in the main study sample.

Scope of Work:

- An official written letter was obtained from the Dean of the Faculty of Nursing, Zagazig University, and sent to the directors of the selected settings to secure their approval for conducting the research, after explaining the study's purpose.
- Verbal consent was obtained from each patient in the study after thoroughly explaining the objectives of the research.
- The study was conducted in four phases: preparation, planning, implementation, and evaluation. These phases took place from May 2024 to October 2024.
- Researchers visited the designated setting three times a week (Saturday, Sunday, and Thursday) from 9:00 am to 1:00 pm. The data collection process for each session took approximately 30-45 minutes, and the overall data collection span lasted about six months.

Assessment phase: The researcher started to recruit participants after reviewing their eligibility. Separate interviews were conducted using the data collection form with individuals who gave their consent. The data collected served as a preliminary

assessment that the researcher used to shape the learning instructional program.

Planning phase: The researcher developed a learning instructional program to educate patients with permanent pacemaker device to improve their knowledge, practice and QOL results.

A theoretical and practical component were both included in the learning instructional program. To help patients understand and retain the information given, the researcher created an illustrated learning program in simplified Arabic

Implementation phase: The researchers conducted individual meetings with the patients and implemented the foundational learning program across ten-session intervals, with each session lasting 30 to 45 minutes. The initial session was an orientation to the foundational learning curriculum. The researchers employed accessible language to align with the patient's educational level, using incentives and reinforcement to facilitate learning. A copy of the software was provided to each patient for future reference. The subsequent three sessions were theoretical, encompassing the basic structure and function of the heart, the normal pulse rate, sites of measuring pulse, and Pacemaker information regarding meaning, indication, types, how the pacemaker works, battery replacement, expected complications and its preventive measures, medications, signs of pacemaker malfunction and importance of medical follow up. This was followed by six practical sessions that included an applied learning instructional program covering critical practices such as incision care techniques, pulse rate measurement, activity limits, and the avoidance of specific electrical equipment near the pacemaker site. Avoid postures that exert pressure on the site, inform all healthcare providers about the pacemaker, carry the pacemaker identification card at all times, and adhere to routine follow-up treatment with the physician as indicated.

Evaluation phase: Every patient in the study had 2 evaluations utilizing identical data-gathering tools. This was conducted at the

time of recruiting (pre-test) and after 3 months of instructional learning as a post-test.

The Learning Instructional program: It was developed according to previously assessed needs of patients with permanent pacemaker device designed as a booklet in Arabic and augmented with photographs and illustrations to enhance patients' comprehension of the material. by the researchers grounded in pertinent literature and expert views (Polikandrioti, 2021 & Sikora,2021)

Statistical analysis

The data was validated before entry into the computer system. The analyses utilized the Statistical Package for Social Sciences (SPSS version 20.0), thereafter organizing and tabulating the data. Descriptive statistics, such as mean, standard deviation, frequency, and percentages, were utilized. Chi-square tests and Pearson correlation coefficients were utilized to evaluate significance. A $p < 0.05$ was deemed statistically significant, but a $p \leq 0.001$ was classified as very significant.

Results

Table (1) regarding patients' age, the results revealed that 62% were between 53 < 63 years old. Most of the patients were male (86%) and married (84%). Additionally, 60% of the participants had attained a high school education. Concerning area of residence most of the patients were living in rural areas (94%). All patient were not enough income and 58.0% were crowding index >2.

Table (2) depicts the distribution of assessed patients based on clinical data. In terms of medical diagnosis, it was discovered that nearly two-thirds (64%) of the study participants suffered from myocardial infarction. Furthermore, 66% experienced heart problems for one year to less than ten years. Regarding family history of heart disease, the table shows that 80% of the patients in the study had a history of heart disease. Regarding

treatment strategies, the table shows that the majority of the patients in the study (40%) were using antihypertensive, antiarrhythmic, and anticoagulant medications. Whereas just 10% were using antihyperlipidemic-antiarrhythmic-Clot-dissolving agents. It was shown that half of the patients in the study (54%) experienced dizziness, palpitation before the implantation of a permanent pacemaker, which is one of the most prevalent symptoms prior to this procedure.

Table (3) shows the total score of patients' knowledge of permanent pacemaker device throughout the study. In comparison to the pre-intervention mean of 5.60 ± 1.74 , the post-intervention mean of 13.16 ± 1.36 showed a highly statistically significant improvement in the overall satisfaction of patients' knowledge

Table (4) the overall score reflecting the practice levels of the patients regarding the permanent pacemaker device across the different phases of the study is shown in Table 4. The results indicated a highly significant increase in the total satisfactory practice levels of patients, with a mean \pm SD of 75.78 ± 5.02 after the intervention, compared to 35.12 ± 10.05 before intervention.

Table (5) revealed that mean differences scores of QOL among studied patients throughout intervention phases. It was found that there were statistically significant improvements in mean differences scores of all dimensions of patient QOL in post intervention compared to pre intervention phase with P. value <0.001.

Table (6) shows the relationship between the cumulative scores of patients' knowledge, practices, and QOL during several phases of the study. The research revealed a statistically significant positive link between patients' practice scores and their QOL during the pre-implementation phase, with a p-value of <0.01. A statistically significant positive association was identified between patients' overall knowledge scores and QOL in the post-implementation phase, with a p-value of 0.041.

Table (1): Sociodemographic Characteristics of the Studied Patients (n=50)

| Sociodemographic Characteristics | No | % |
|----------------------------------|-------|-------|
| Age (in years) | | |
| 43-<53 | 11 | 22.0 |
| 53-<63 | 31 | 62.0 |
| ≥63 | 8 | 16.0 |
| Mean± SD | 57±6 | |
| Range | 43-68 | |
| Gender | | |
| Male | 43 | 86.0 |
| Female | 7 | 14.0 |
| Academic level | | |
| Non-literate | 12 | 24.0 |
| Reads & writes | 4 | 8.0 |
| High school level | 30 | 60.0 |
| College education | 4 | 8.0 |
| Marital status | | |
| Married | 42 | 84.0 |
| Widow | 8 | 16.0 |
| Number of children | | |
| 2 | 5 | 10.0 |
| 3 | 21 | 42.0 |
| >3 | 24 | 48.0 |
| Income | | |
| Not enough | 50 | 100.0 |
| Residence | | |
| Rural | 47 | 94.0 |
| Urban | 3 | 6.0 |
| Crowding index | | |
| <2 | 21 | 42.0 |
| >2 | 29 | 58.0 |

Table (2): Distribution of the studied patients according to their clinical data. (n=50)

| Clinical Characteristics | No | % |
|--|----|----|
| Medical Diagnosis: | | |
| Congenital heart diseases | 7 | 14 |
| Myocardial Infarction | 32 | 64 |
| Coronary artery diseases | 6 | 12 |
| Heart Failure. | 5 | 10 |
| Duration of the illness: | | |
| Months to < 1 year | 12 | 24 |
| 1 < 10 years | 33 | 66 |
| 10 < 20 years | 5 | 10 |
| Family history of heart disease: | | |
| Yes | 40 | 80 |
| No | 10 | 20 |
| Medication Regimen: | | |
| Anti-hypertensive-antiarrhythmic | 10 | 20 |
| Anti-hyperlipidemic-antiarrhythmic | 8 | 16 |
| Coagulation inhibitors - antiarrhythmic | 7 | 14 |
| Antihypertensive-antiarrhythmic-anticoagulants | 20 | 40 |
| Antihyperlipidemic-antiarrhythmic-Clot-dissolving agents | 5 | 10 |
| Symptoms pre- the insertion of a pacemaker. | | |
| Dizziness, Palpitation | 27 | 54 |
| Dizziness, Syncope | 10 | 20 |
| Heart fluttering, Thoracic pain | 9 | 18 |
| Breathlessness, Palpitation | 4 | 8 |

Table (3): Total Score of Studied Patients' Knowledge level regarding permanent pacemaker device throughout Study Phases (n= 50).

| Total patients' knowledge | Study phase | | | | MC p |
|---------------------------|--------------------|------|---------------------|------|-----------|
| | Pre - Intervention | | Post - Intervention | | |
| | No. | % | No. | % | |
| Satisfactory level > 60% | 7 | 14.0 | 47 | 94.0 | < 0.001** |
| Un-satisfactory level<60% | 43 | 86.0 | 3 | 6.0 | |
| Mean± SD | 5.60±1.74 | | 13.16±1.36 | | |
| Median (range) | 6(1-8) | | 13.5(6-14) | | |

MC: McNemar test

**: statistically highly significant (p<0.001)

Table (4): Total Score of Studied Patients' Practice Level Regarding permanent pacemaker device throughout Study Phases (n= 50)

| Total patients' practice | Study phase | | | | MC p |
|---------------------------|--------------------|------|---------------------|------|-----------|
| | Pre - Intervention | | Post - Intervention | | |
| | No. | % | No. | % | |
| Satisfactory level> 60% | 5 | 10.0 | 44 | 88.0 | < 0.001** |
| Un-satisfactory level<60% | 45 | 90.0 | 6 | 12.0 | |
| Mean± SD | 35.12±10.05 | | 75.78±5.02 | | |
| Median (range) | 36(14-58) | | 75(64-90) | | |

Table (5): Mean difference score of QOL among the studied patients the throughout Intervention Phases (n= 50).

| Dimensions of patient QOL | Study phases | | W | P- value |
|---------------------------|--------------------------------|--------------------------------|-------|----------|
| | Pre- Intervention Mean ± SD | Post-Intervention Mean ± SD | | |
| Mobility | 4.32±2.17 | 9.20±1.56 | 6.179 | <0.001** |
| Self-Care | 2.62±1.16 | 8.26±0.66 | 6.199 | <0.001** |
| Usual Activities | 2.22±0.95 | 8.32±0.47 | 6.221 | <0.001** |
| Pain/Discomfort | 5.19±1.23 | 9.54±1.49 | 5.139 | <0.001** |
| Anxiety/Depression | 3.22±0.38 | 7.46±0.56 | 4.122 | <0.001** |
| Total Score(degree=25) | 17.57±5.89 | 42.78±4.74 | 27.86 | <0.001** |

Table (6): Correlation between Total Scores of Patients' Knowledge, Practice and QOL among Studied Patients throughout Study Phases (n=50).

| Parameter | | patients' QOL | | | |
|---------------------------------|------|--------------------|----------|---------------------|--------|
| | | Pre - Intervention | | Post - Intervention | |
| | | (r) | P | (r) | P |
| Overall participants' knowledge | Pre | 0.153 | 0.290 | | |
| | Post | | | 0.290 | 0.041* |
| Overall participants' practice | Pre | 0.538 | <0.001** | | |
| | Post | | | 0.012 | 0.934 |

Highly significant (p<0.01), r: correlation coefficient.

Discussion

Pacemaker implantation is a crucial procedure for managing arrhythmias and cardiac conduction disorders. Despite its importance, the treatment can lead to both physical and psychological challenges for patients, which may negatively impact their overall QOL (QOL) (Torabi et al., 2018; Molna et al., 2018). Nurses, as essential members of healthcare team, significantly

contribute to improving patients' QOL throughout specific nursing involvements (Oliveira et al., 2022).

A permanent pacemaker has the potential to extend life and prevent mortality in various situations, while also significantly enhancing the patient's QOL. Patients who receive continuous support in adapting to their pacemaker tend to achieve the most favorable outcomes post-implantation (Timby & Smith,

2019). Consequently, this study was conducted to assess the impact of educational interventions on the QOL in individuals with permanent pacemaker implants.

Results of current research indicated that male patients out-numbered female patients, a finding consistent with **Figuroa and Weheida et al. (2021)**, in their study "Psychological intervention to modify anxiety, depression, and QOL in patients with an implantable pacemaker," also found that the majority of participants were males. This might be attributed to several factors, including the higher likelihood of men experiencing stress due to physically demanding activities compared to women, and the reduced outlets for emotional expression in the workplace for men. Additionally, the protective impact of estrogen on coronary arteries may contribute to women's lower risk of coronary artery diseases before menopause. Regarding marital status, most patients in this study were married, which could suggest that married individuals might be more prone to cardiac issues due to the ongoing psychological stress associated with their social roles. However, this finding contrasts with the study by **Naimi et al. (2020)**, titled "The Effect of Religious Intervention Using Prayer for QOL and psychological status of patients with permanent pacemaker," where the majority of participants were widowed. The difference could be related to the psychological effects of spousal loss and the experience of loneliness.

To develop effective treatments that enhance patients' QOL, nurses need to have a clear understanding of the patient's current QOL. In such a setting, our current study compared the QOL of patients before and after permanent cardiac pacemaker implantation. The study indicated that over half of the participants were between the ages of 50 and 60. This trend may be attributed to the higher incidence of heart disease among older individuals, as well as their repeated exposure to life stressors and the physiological changes in coronary arteries that occur with aging. Additionally, **El Senousy and Abdelatief (2017)** in their research "Effect of self-care management on nursing-sensitive patients' outcomes after permanent pacemaker implantation" noted that the number of patients receiving pacemakers around the age of 40 has risen recently. They linked this trend to unhealthy lifestyle choices, particularly the increased consumption of fast food and a sedentary lifestyle among younger people.

Likewise, **CHAD (2019)** supported these findings, highlighting that educational programs play a crucial role in maintaining patients' ability to perform tasks efficiently and effectively, thereby improving their QOL. Additionally, patients who are actively engaged in understanding all aspects of their condition are more likely to participate in activities that promote behavioral changes and improve physical well-being, compared to those who are less focused on their illness (**Ackley & Fuster, 2017**).

Additionally, studies have shown that providing written materials positively influenced patients' understanding. Patients who received a booklet were better informed about their diagnosis and reported higher satisfaction with the information compared to those in the control group (**Faltas, 2017**). Furthermore, knowledge levels were notably lower before the educational sessions but improved significantly afterward. Both younger and older patients demonstrated an increase in their knowledge, and it was found that those with higher knowledge levels were more likely to engage in increased activity following the implantation of a permanent pacemaker (**Ibrahim., 2017**).

Regarding medical diagnoses, nearly half of the patients in this study had experienced a myocardial infarction. However, this finding contrasts with the results of **Sharma (2018)**, in their study entitled "Assessment of Effectiveness of Permanent Pacemaker Care Guidelines on Patient Activity and Adherence," where more than half of the patients in the control group and nearly half in the experimental group were diagnosed with total heart block. Other common indications for permanent pacemaker implantation included sick sinus syndrome and second-degree heart block. The differences between these studies may be attributed to variations in the patient's geographic location and age groups.

As for the most common symptoms prior to pacemaker insertion, this study found that half of the patients experienced dizziness and palpitations. However, **Sharma et al. (2018)** reported that the majority of their study participants in both the control and experimental groups experienced dyspnea and syncope upon admission. The researchers suggest that the discrepancies in the symptoms reported by the two studies likely stem from the different underlying causes of arrhythmias in the patient populations.

To assess mobility, the current study revealed that one- and three months post-implantation, all patients exhibited little to moderate mobility difficulties. The results are ascribed to the pacemaker's beneficial effect on enhancing everyday activities and, indirectly, on the physiological consequences related to arrhythmias. This finding corroborates the research of Sharma et al. (2018), who observed that the capacity to autonomously execute activities of daily living—including feeding, bathing, grooming, mobility, transferring, toileting, and ascending stairs—enhanced in both the study and control groups, with a significant ($p < 0.05$) from pre-pacemaker implantation to two months post-implantation. Before pacemaker installation, the majority of patients in the research experienced moderate to severe challenges with self-care and everyday activities; however, between one- and three months post-procedure, most exhibited either no or only moderate difficulty with these tasks. The data indicate that the recovery process was predominantly complete, and the device was adequately calibrated, and patients had acclimated to the lifestyle modifications instructed during hospitalization to avert problems. This conclusion aligns with the recommendations of Abbasi et al. (2016) in their study "The Challenges of Living with an Implantable Cardioverter Defibrillator: A Qualitative Study," which underscored the necessity of furnishing patients with sufficient and pertinent information following pacemaker implantation to mitigate post-implantation complications.

The study observed a reduction in pain following pacemaker implantation compared to before the procedure. This finding is supported by Magnusson and Liv (2018) in their study, "Living with a Pacemaker: Patient-Reported Pacemaker System," which found that the majority of pacemaker patients reported high levels of satisfaction with their pacemaker system, citing benefits such as pain relief, satisfactory cosmetic outcomes, good shoulder mobility, improved sleep, and no concerns about device malfunction.

Additionally, the study noted a decrease in anxiety following pacemaker implantation, which was linked to improved self-care management and the ability to resume normal activities. The reduction in pain and the sense of empowerment gained through education provided patients with a feeling of strength and support, which in turn helped alleviate anxiety.

This aligns with the findings of Sikora et al. (2020) in their study "QOL of Patients After Pacemaker Implantation," which suggested that improving the care of cardiac patients, particularly by addressing psychological factors, can significantly enhance their QOL. These factors should be considered in therapeutic approaches to promote better patient outcomes.

The current study found highly significant differences in the QOL of patients before and after pacemaker implantation, with notable improvements one- and three-months post-procedure. This finding is consistent with Snegalatha et al. (2019), in their study titled "Knowledge and Attitude Regarding Permanent Pacemakers and the QOL of Patients After Permanent Pacemaker Implantation," which reported a positive correlation between patients' knowledge and attitudes toward their condition and their quality-of-life following pacemaker implantation. Similarly, Polikandrioti (2021) in "Patient Perceptions and QOL in Pacemaker Recipients" confirmed that the QOL after pacemaker implantation was linked to the level of information patients had about the procedure. Furthermore, Silva, Caminha, and Ferreira (2019) in their study "QOL of Individuals with Implantable Electronic Cardiac Devices" found that patients' QOL improved post-implantation due to reduced symptoms in areas such as dyspnea and discomfort, as well as lifestyle adjustments. Sikora (2021) also noted that the QOL of most pacemaker recipients remained at least at a good level. These findings collectively validate the positive impact of pacemaker implantation on improving both the physical health and QOL of patients.

The present investigation indicated a notable deterioration in the QOL for patients three months post-pacemaker implantation (PPI). This deterioration was linked to delayed complications, inadequate follow-up care, or a lack of knowledge regarding pacemaker maintenance post-surgery. These findings underscore the crucial role nurses play in educating patients about the proper care of their pacemakers, including battery management, follow-up appointments, potential complications, and how to address them. A well-structured and systematic approach to educating both patients and their families about cardiac pacing and the importance of regular follow-up care is essential in nursing practice,

as it can significantly enhance patients' QOL in the long term.

The findings of this study emphasize that nursing care for patients with a permanent pacemaker requires a thorough understanding of the device, its potential challenges, and the patient's hemodynamic status. Nurses' expertise is crucial in-patient education, helping to prevent complications throughout the pacemaker's lifespan. A well-structured nursing approach can minimize device-related issues and malfunctions. By providing comprehensive care, nurses can help maintain a high QOL for patients with implanted pacemakers. These considerations are essential when developing a nursing therapeutic regimen for these patients.

This finding is reinforced by a study suggesting that nurses play an essential role in helping patients adjust to life with a permanent pacemaker (**Orly & Orna, 2018**). This aligns with other research that emphasized how their findings could improve the quality of care for cardiac patients. The study underscored the importance of psychological factors in shaping patients' QOL and recommended integrating these factors into therapeutic plans to foster better patient engagement and cooperation (**Snegalatha, Anand, Seetharaman, & John, 2019**).

The study also revealed a significant decline in patients' QOL three months after pacemaker implantation. The researchers attributed this decline to late complications related to the pacemaker, missed follow-up appointments, or a lack of knowledge about post-surgery pacemaker care. This highlights the crucial role nurses play in educating patients about maintaining the pacemaker's battery, managing potential complications, and how to address them. To improve these patients' QOL moving forward, nursing care should involve a structured and comprehensive approach to educating both the patient and their family about cardiac pacing and the importance of follow-up care (**Silva, Caminha, & Ferreira, 2019**).

Patients with permanent pacemakers want further knowledge regarding non-pharmacological approaches to alleviate bothersome symptoms (**Weheida et al., 2021**). The present study indicated that the enhanced coping mechanisms found among participants during different assessment phases may be ascribed to the dissemination of pamphlets, posters, and educational resources as part of an informational campaign. The papers addressed

critical subjects such as pacemaker precautions, postoperative wound care and pulse monitoring instructions, and the operational mechanics of the pacemaker, which generated considerable interest among the research participants.

Furthermore, effective nursing care for pacemaker patients necessitates a deep understanding of the device, its associated risks, and the patient's hemodynamic condition. Nurse-led patient education and support throughout the device's lifespan can help reduce complications. A well-developed nursing care plan can prevent device malfunctions and issues, ultimately maintaining a high QOL for pacemaker recipients. Therefore, nursing therapeutic regimens must consider these factors when planning care for these patients (**Assadi & Alange, 2016**).

The outcomes of this study corroborated the research hypothesis that the average scores for knowledge and practices, as well as the beneficial impact of instructional learning, increase patients' QOL.

Conclusion

The study revealed extremely significant variations in patients' knowledge, practice and QOL between pre- and post-assessments three months following the implementation of learning instructions and permanent pacemaker implantation.

Recommendations

The following recommendations are proposed for patient care:

- The educational program should be integrated as a key element in the comprehensive care plan for patients receiving pacemakers.
- A periodically updated, color-illustrated booklet containing detailed post-implantation instructions should be provided to all patients undergoing permanent pacemaker implantation.

Regarding future research:

- The study should be replicated with a larger sample size and over a longer duration to validate the findings of the current research.
- Further studies should be conducted on the long-term effects of the educational program on patient outcomes.

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